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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/622,484	01/02/2001	Kazuo Sugai	500 38900X00	6568

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EXAMINER
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KIANERSI, MITRA

ART UNIT	PAPER NUMBER
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2143

DATE MAILED: 02/12/2004

11

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/622,484

Applicant(s)

SUGAI ET AL.

Examiner

mitra kianersi

Art Unit

2143

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 December 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 11-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 11-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### *Drawings*

The drawings were received on Dec/22/2003. These drawings are approved.

### *Specification*

The examiner acknowledges an amendment to the specification and Abstract filed on Dec/22/2003.

### *Response to Amendment*

Applicant's arguments filed Dec/22/2003 have been fully considered but they are not persuasive.

Regarding claims 11, 18, and 19, applicant on page 12, lines 4-10 argues that Chao et al. do not disclose or suggest retrieving the information of next path of packet transmission from the destination address.

Chao et al. on col 4, lines 22-25 disclose that routers use destination address information to forward packets toward their destination. Chao et al. also disclose, sending and receiving application agree on a format and encoding and agree to exchange data and if necessary the data are converted (character code, compression, encryption, etc.) to a form expected by the destination. (col 4, lines 41-44). The header may include a connection identifier and the trailer may contain a frame check sequence. Each frame is then, transmitted by the physical layer over the transmission medium, as a sequence of bits. (col 4, lines 57-62)

Applicant also argues on page 12, lines 6-10 that Chao et al. do not disclose or suggest path information generating unit combining a total of  $(2^{p-1})$  2-branch tree nodes comprising one 2-branch tree node and 2-branch tree nodes of  $(p-1)$  levels connected

to said one 2-branch tree node, into one  $2^p$ -branch tree node and outputs said one  $2^p$ -branch tree node as said path information to said path information.

Chao et al. on col 6, lines 2-6 disclose that, when the transfer of information is complete, the resources are released (are made available) by the line terminal, there by permitting operation to operate at high data rate.

Applicant on page 13, lines 1-8 argues that in Chao et al. the validity bits corresponding to the maximum time stamps are divided into a plurality of groups each having a predetermined bits and logical division of the validity bits of each group is taken. By repeating the grouping and taking the logical addition, the groups of validity bits are classified in a layered architecture. Chao et al. on part (E) and (F) of claim 10, disclose a method, for inverting the word to generate an inverted word, logically ANDing, bit by bit, the inverted word and the validity based bits to generate an AND result. In response to page 13, lines 4-5, regarding not being a path information generating unit, Chao et al. disclose a method where in the step of searching includes sub-step of encoding the contents of the storage device at level 1=0 to generate a bit string. (col 39, lines 13-14) Regarding dependent claims 12-17, because the arguments with respect to the allowableness of claims 11, 18, and 19, were found unpersuasive, these same arguments are not persuasive with respect to the other independent claims.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 11-19 rejected under 35 U.S.C. 102(e) as being anticipated by Chao et al.  
(US. Patent No. 6,389,031)

1. As to claim 1, a network forwarding device connecting a plurality of networks comprising:

a port to which one of said networks is connected (the interface between end system and the network, col 3, lines 9-12)

a network interface connected to port and controlling an interface with the network connected to said port; (network access layer, col 3, line 3, section iv)

a routing processor connected to said network interface via an Intra-device communication line and performing routing of a packet received from network interface (internet layer, col 3, lines 13-15) wherein said routing processor includes path information generating unit for generating path information comprising a plurality of 2-branch tree nodes, each corresponding to a value which can be taken by each bit of a destination address of said packet;

path information holding means for holding said path information generated; and

next-path searching means for checking each bit of said destination address of said packet received from a high-order bit one by one and determining a path to which said packet received is to be forwarded next by retrieving said 2-branch tree nodes of said path information corresponding to each bit value of said destination address (routers use destination address, col 4, lines 23-34); and wherein, said path information generating unit combines a total of  $(2^p-1)$  2-branch tree nodes comprising one 2-branch tree node and 2-branch tree nodes of  $(p-1)$  levels connected to said one 2-branch tree node, into one  $2^p$ -branch tree node and outputs said one  $2^p$ -branch tree node as said path information to said path information holding means, wherein said  $p$  is an integer equal to or larger than 2, and wherein said next-path searching means

checks  $p$  bits of said destination address of said packet, received at one time and retrieves  $2^P$ -branch tree node corresponded. (col 20, lines 56-66) and (see Fig 15).

2. The network forwarding device wherein said  $2^P$ -branch tree node is formed by combining  $2^{(P-1)}$  2-branch tree nodes, and said  $2^P$ -branch tree node comprises path data included in said  $(2^P-1)$ -2-branch tree nodes, and when each of said  $(2^P-1)$  2-branch tree nodes includes the same data, said  $2^P$  branch tree node comprises said same data as one data. See Col. 39, claim 6 (II)-claim 10(F), and (col 40, claim 12)

3. The network forwarding device, wherein said next-path searching means does not read a whole node when reading the  $2^P$ -branch tree node from said path information holding means but reads only data corresponding to one of the  $2^{(P-1)}$  2-branch tree nodes combined when the  $2^P$ -branch tree node was created. (see Fig 21) and (col 23, lines 26-31)

4. The network forwarding device according to claim 4, wherein said path information generating unit stores mask length corresponding to said  $2^P$ -branch tree node, not mask length corresponding to other  $2^P$ -branch tree node storing a pointer for said  $2^P$ -branch tree node,

and wherein said next-path searching means comprehends mask length corresponding to said  $2^P$ -branch tree node to be read later, when data of said other  $2^P$ -branch tree node is read and selects a portion of data to be read from said  $2^P$  branch tree node according to values of  $P$  bits beginning from a bit position indicated by said mask length in said destination address of said packet received. (see Fig.21) and (col 23, lines 26-31)

5. The network forwarding device wherein said  $2^P$ -branch tree node comprises a flag as a data which is first read by said next-path searching means, said flag indicating whether or not a path is allocated to said  $2^P$ -branch tree node, and wherein when said next-path searching means reads said  $2^P$ -branch tree node from said path information holding means, said flag is first read, and when said flag indicates that a path is not

allocated, said next-path search means does not read path data. (see Fig 3A, illustrating the flag field 312 used to control fragmentation.)

6. The network forwarding device, wherein said network forwarding device is a router. (col 1, line 8)

7. The network device, wherein said path information generating unit generates  $2^m$   $2^P$ -branch tree nodes ( $2^m \times (2^P - 1)$ ) 2-branch tree nodes, said  $2^m$   $2^P$ -branch tree nodes respectively corresponding to mask lengths from m bit to (m- (p-1)) bit, wherein said m is a natural number, and wherein each  $2^P$ -branch tree node is stored in a predetermined region of said path information holding means, and wherein said next-path searching means selects one region among regions storing each  $2^P$ -branch tree node according to a value represented by bits 0-th bit to (m-1)th bit of said destination address of said packet received, and reads one  $2^P$ -branch tree node from said region selected in said path information holding means. (col 25, lines 17-31) and (col 16, lines 52-67)

8. A network forwarding device connecting a plurality of networks comprising:  
a port to which one of said networks is connected;(col 3, lines 9-12)  
a network interface connected to said port and controlling an interface with the network connected to said port; and  
a routing processor connected to said network interface for performing routing of a packet received from said network interface;  
a management unit connected to said routing processor via an intra-device communication line for generating path information and delivering said path information to said routing processor, said path information including a plurality of 2branch tree nodes, each corresponding to a value can be taken by each bit of a destination address of a packet; wherein said routing processor includes: a memory for holding said path information delivered from said management unit; and

next-path searching means for checking each bit of said destination address of said packet received from a high-order bit one by one and determining a path to which said packet received is to be forwarded next by retrieving said 2-branch tree nodes of said path information corresponding to each bit value of said destination address: and wherein said management unit combines a total of  $(2^p-1)$  2-branch tree nodes comprising one, 2-branch tree node and 2-branch tree nodes of  $(p-1)$  levels connected to said one 2-branch tree node, into one  $2^p$ -branch tree node and delivers said one  $2^p$ -branch tree node as said path information to said routing processor, wherein said  $p$  is an integer equal to or larger than 2, and wherein said next-path searching means checks  $p$  bits of said destination address of said packet received at one time and retrieves said  $2^p$ -branch tree node corresponding to values of said  $p$  bits. (col 38, lines 54-63)

19. A network next-hop search method for use in network forwarding device connected to a plurality of network and transmitting a packet received from one of said networks to a next hop based on path information comprising the steps of:  
generating path information comprising a plurality of 2-branch tree nodes, each corresponding to a value which can be taken by each bit of a destination address of a packet; holding said path information generated; (col 6, lines 2-6)  
checking bits of said destination address of said packet received from a high order bit one by one and retrieving said 2-branch tree nodes corresponding to each bit value- and determining a path to which said packet received is to be forwarded next wherein, said step of generating a path information combines a total of  $(2^p-1)$  2-branch tree nodes comprising one 2-branch tree node and 2-branch tree nodes of  $(p-1)$  levels connected to said one 2-branch tree node, into one  $2^p$ -branch tree node as said path information, wherein  $p$  is an integer equal to or larger than 2, and said step of retrieving checks  $p$  bits of said destination address of said packet received at one time and retrieves said  $2^p$ -branch tree node corresponding to values of said  $p$  bits. (col 20, lines 56-66) and (Fig.15)



### *Conclusion*

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mitra Kianersi whose telephone number is (703) 305-4650. The examiner can normally be reached on 7:00AM-4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wiley can be reached on (703) 308-5221. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mitra Kianersi

Feb/11/2004



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